

# Riding Out the COVID-19 Storm: How Government Policies Affect SMEs in China

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## Abstract

Based on a nationally representative survey on SMEs in China, we study the impact of government policy interventions on SMEs during the COVID-19 pandemic. Our findings are three-fold. First, regional and local lock-down policies decrease SMEs' incidence of reopening and delay their expected reopening in the near future, likely by reducing consumer demand. Second, stabilization policies in the form of payment deferrals and exemptions significantly improve SMEs' cash flows and further stimulate their operational recovery. This effect is more pronounced for firms with larger shares of high-skilled employees. Last, financial support policies do not appear to be effective in alleviating SMEs' cash constraints or encouraging the reopening of small businesses, potentially due to difficulties in accessing policy-oriented loans and misallocation of credit. Our findings shed new light on the policy debates on supporting SMEs during the COVID-19 pandemic.

*Keywords:* COVID-19, Policy, China, SME.

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# 1 Introduction

Small and medium enterprises (SMEs) form an essential part of the economy. They are also the hardest hit by the COVID-19 crisis. While numerous policies have been introduced by governments around the globe to combat the virus and to stimulate the economy, their impact, especially on SMEs, remain understudied. In this paper, we investigate how lock-down and stabilization policies affect SMEs' operating conditions, decisions and expectations.

To study those questions, we utilize a survey of over 2,000 SMEs from 62 Chinese cities. The first wave of the survey was conducted between February 10 and 13, after all provincial governments in China declared first-degree state of emergency, and a number of local lock-down and stabilization policies were introduced. The second wave was conducted between May 18 and 25, when the spread of COVID-19 had largely been contained, and economic recovery was well under way with support from nationwide stabilization policies.

We explore three types of policies in detail: lock-downs, payment relief, and financial support; and focus on SMEs' decisions to reopen, expectations of reopening, self-assessment of future cash balance, and percentage of employees who have returned to work. To examine short-run policy effects, we combine the first wave of the survey with hand-collected information on local policies in early February, which were enacted semi-independently by provincial and city governments and exhibited substantial geographical variations. To examine the medium-run effects of stabilization policies, we apply a propensity-score matching (PSM) method on the May wave of the survey to study how national policies affect firms.

We begin by documenting that city-level and provincial-level lock-downs in February are associated with significantly smaller likelihood to reopen (8.4% and 14% respectively), as well as a 12-13% smaller likelihood of expecting to reopen within one month. On the other hand, SMEs that benefit from payment relief policies are less likely to face short-term liquidity constraints in February: the probability is reduced by 5.5% under social security deferrals and 12% under rent reductions. Furthermore, SMEs under social security deferrals are 7.2% more likely to have reopened by the time of the February wave, and 11% more likely to reopen within one month. In contrast, we do not observe analogous effects for financial policies.

We find similar results for the medium-run effects of national stabilization policies: SMEs that received social security exemptions are 8.5% more likely to reopen and 10.1% more likely to have over half of their employees return to work, and SMEs that received rent exemptions are 12.8%

less likely to face short-term cash constraints. Again, we find no evidence that SMEs that received credit and loan supports see improvements in short-term liquidity or likelihood of reopening.

We perform heterogeneity analysis to disentangle potential channels through which local policies affect SMEs. We first examine the impact of lock-downs on SMEs that face different types of demand. Under provincial highway lock-downs, which hinder the flow of goods across cities and provinces, SMEs relying on non-local customers are much less likely to reopen. Under city-wide social-distancing policies, which restrict face-to-face transactions, SMEs that are offline sellers are less likely to reopen. No substantial differences in expected delays in reopening are observed, which is likely because lock-downs are of a temporary nature. These results are consistent with [Alexander and Karger \(2020\)](#) and [Allcott et al. \(2020\)](#), who find that stay-at-home orders lead to a decrease in consumer spending, and with [Balla-Elliott et al. \(2020\)](#), who find that businesses' reopening decisions depend on expected demand.

We then explore the effects of stabilization policies on SMEs with different characteristics. Under social security deferrals, SMEs with a larger share of highly-skilled workers, which we argue reflects a larger share of formal employment,<sup>1</sup> higher social security expenses and more flexible work arrangements, are significantly less likely to face short-term cash constraints and more likely to reopen. In addition, we find no evidence that financial support policies especially benefit SMEs with positive account receivables, a proxy for their ex-ante liquidity constraints. This ineffectiveness likely arises from the long-standing difficulty for Chinese SMEs to obtain external financing.<sup>2</sup>

Our paper is among the earliest studies on how policy instruments can be used to mitigate the impact of COVID-19 on SMEs, and contributes to a fast growing literature that studies the economic consequences of the pandemic. Several papers use survey evidence to study firms' primary challenges in and responses to the COVID-19 crisis ([Barrero et al., 2020](#); [Balla-Elliott et al., 2020](#); [Buchheim et al., 2020](#)), and some use stock prices to directly evaluate the impact of the crisis on the performance of listed firms with different characteristics ([Ding et al., 2020](#); [Hassan et al., 2020](#)). A number of studies examine the effects of policy announcements on the expectations of individuals and SMEs ([Coibion et al., 2020](#); [Baker et al., 2016, 2020](#)), and others investigate the effects of stay-at-home orders and economic stabilization policies on labor and consumption ([Chetty et al., 2020](#); [Granja et al., 2020](#); [Mongey et al., 2020](#)). [Kawaguchi et al. \(2020\)](#) find that lump-sum transfers improves firms' expected survival, but not their performance. Our study connects

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<sup>1</sup>[Liang et al. \(2016\)](#) show that workers with more years of education are more likely to be under formal employment.

<sup>2</sup>[Ayyagari et al. \(2010\)](#) and [Poncet et al. \(2010\)](#) demonstrate that Chinese private firms are credit constrained and only a small percentage utilize bank loans.

and enriches these two strands of literature by analyzing the effectiveness of government policies from the perspective of SMEs. We find that lock-downs, which are found to depress consumer demand (Alexander and Karger, 2020; Allcott et al., 2020), further translate to a dampening effect on SMEs’ decisions and expectations to reopen; that payment deferrals can ease SME’s liquidity constraints, which proves to be one of firms’ predominant concerns (Bartik et al., 2020; Li et al., 2020), and assist SMEs to reopen; and that financial policy may not always achieve the desired effect of directing resources towards to the financially vulnerable. These insights are particularly valuable for policymakers. Our paper also contributes to studies that examine the impact of COVID-19 on the Chinese economy (Chen et al., 2020; Fang et al., 2020; He et al., 2020).

This paper is organized as follows. Section 2 introduces the main policies that were widely adopted by Chinese cities and are examined in detail in this paper. Section 3 describes the data and the empirical strategy. Sections 4 analyzes the short-run and medium-run impacts of policies. Section 5 discusses the findings. Section 6 concludes.

## 2 Overview of Policies

Beginning with the lock-down of Wuhan on January 23, national and regional governments in China prescribed various policies to mitigate the impact of COVID-19. We hand-collect information on local policies for the 62 cities in which the surveyed SMEs are located, from official announcements and news articles. We focus on local policies that were announced on or before February 10, which is the starting date of our February survey.

We categorize policies into two groups: lock-down policies, which aim to contain the spread of COVID-19, and stabilization policies, which aim to provide economic support to firms. There exists substantial variations in the timing, type, scale and intensity of policies across cities in our sample. In Appendix A, we discuss our policy coding procedure, and present a summary of policies that were enacted by each city.

It should be noted that lock-down and stabilization policies were first proposed and enacted at the local level. Starting from February 20, the central government announced a series of nationwide policies to be implemented by regional governments, and many of them were a continuation of and an upgrade over local policies. This led to a convergence of policies on the national level, which covered all policies examined in this paper.<sup>3</sup> The fortunate timing of our survey enables us to

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<sup>3</sup>On February 20, the Ministry of Human Resources and Social Security announced a social security payment exemption of up to 5 months; the Ministry of Finance announced a 50% reduction in credit guarantee and counter-guarantee

exploit the narrow window in which variations in local policies existed.

It is also worth noting that most of the policy interventions in China were also implemented in other countries. Social distancing policies such as stay-at-home orders were widely adopted around the world; deferrals and exemptions of tax and social security payments were adopted in most developed countries such as the United States, Japan, Korea, and major European countries; financial supports such as credit extensions were also provided in many of those countries, with some directly targeting SMEs, such as the Small Business Grant Fund (SBGF) in the United Kingdom and the KfW Fast Loans in Germany.<sup>4</sup> Therefore, our study also sheds light on the effectiveness of those common policy practices.

## 2.1 Lock-Down Policies

Since January 23, lock-down policies were quickly implemented across the entire country, both at the provincial and the city level. At the provincial level, inter-province and inter-city highways were partially shut down in order to limit traffic. At the city level, social-distancing policies were enacted to reduce human contact.

**Provincial Highway Closures.** By early February, a number of provinces had taken measures to reduce traffic on inter-province and inter-city highways. These measures include the closing down of highway entrances, exits and toll stations, and mandatory inspection of freight and cargo, thereby substantially restricting the flow of goods and commodities across regions. We define a province to be enacting *highway closure* if they either shut down toll stations or highway entries and exits.

**City-Wide Social Distancing.** Among the variety of social-distancing policies implemented by city governments, two measures stood out to be the most widely adopted: 1) the close-down of residential communities, and 2) the shutdown of local public transport.

Community close-downs were enforced to varying degrees. Almost all cities required compulsory temperature checks and personal ID inspection upon entry and exit into residential complexes, and prohibited entry by visitors and non-residents. Some cities were much more stringent: they only permitted one member from each household to go out and purchase groceries and other essential items every few days; and prohibited residents from exiting residential complexes unless they needed to go to the hospital, were involved in pandemic prevention and control, or worked in industries

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fees on March 27; the Central Bank and the Banking and Insurance Regulatory Commission announced loan repayment deferrals and issued special loans for SMEs, on February 26 and March 1 respectively; and on May 9, the National Development and Reform Commission announced a rent exemption of 3 months for state-property renters.<sup>4</sup>See Table A2 in the Appendix for details on policies in those sample countries and regions.

closely related to civilian livelihood. We define a city to be enacting *community close-down* if it adopted both of the more stringent measures.

In addition, a number of cities either suspended or reduced the frequency of their public transport services. We define a city to be enacting *transport shutdown* if it suspended local bus services.

For the purpose of analysis, we define a city to be enforcing *social-distancing* if it enacts both community close-downs and transport shutdowns.

## 2.2 Stabilization Policies

Beginning in early February, provincial and city governments enacted a plethora of policies to economically support firms, including but not restricted to, direct subsidies, improved access to financing, deferral and exemption of payment of expenses, and employment protection. We focus on payment relief and financial support, as they were more commonly adopted across cities. More specifically, we examine four policies in detail: rent reduction and social security deferral, which provide payment relief; credit guarantee and loan support, which provide financial assistance.

**Rent Reduction.** This policy generally granted one to two months of rent exemption to commercial tenants renting state-owned properties. In contrast, owners of privately-owned properties were encouraged, rather than required, to negotiate terms of rent relief with their tenants. We define a city to be enacting *rent reduction*, if exemptions are granted to SMEs unconditionally.

**Social Security Deferral.** Chinese firms are required to pay social security contributions for their employees, and face a comprehensive rate of around 55% of employees' base salary.<sup>5</sup> During the COVID-19 crisis, a majority of cities granted social security payment deferrals to firms for a period of up to three months. While some cities granted deferrals automatically, others required firms to apply for and obtain government approval prior to granting deferrals. We define a city to be implementing *social security payment deferral* if deferrals are granted to SMEs automatically.

**Credit Guarantee Support.** Credit guarantee schemes are designed to help SMEs gain access to bank loans, and are adopted by more than half of the countries worldwide.<sup>6</sup> They provide third-party guarantee on loans borrowed by SMEs, and are responsible for repaying these loans, in part or in full, to the issuing banks in case of default.

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<sup>5</sup>See <http://finance.sina.com.cn/zl/china/2020-03-28/zl-iimxyqwa3672119.shtml>.

<sup>6</sup>World Bank. "Principles for Public Credit Guarantee Schemes (CGSs) for SMEs." Worldbank.org. <https://www.worldbank.org/en/topic/financialsector/publication/principles-for-public-credit-guarantee-schemes-cgss-for-smes> (accessed May 31, 2020).

During the COVID-19 pandemic, some cities took measures to reduce the threshold that firms must meet in order to obtain guaranteed credit. These measures include, but are not restricted to, demanding state-owned credit guarantee agencies to drop counter guarantee requirements for borrowers,<sup>7</sup> to offer discounted fees for their services, or to ask for smaller security deposits. We define a city to be enacting *credit guarantee support* if it instructs credit guarantee agencies to drop counter-guarantee requirements, or to adopt two or more other measures to improve firms’ access to guaranteed credit.<sup>89</sup>

**Loan Support.** Loan support policies involve one or more of the following: direct provision of credit, interest subsidies, risk compensation, and loan repayment deferrals. The first refers to an increase in the amount of private business loans, or the issuance of emergency relief loans for SMEs. The second refers to subsidies on interest payments on new business loans borrowed in 2020.<sup>10</sup> The third refers to an increase in the rate of compensation to banks by city governments for losses from loan defaults.<sup>11</sup> The last refers to instructing banks and financial institutions to defer loan repayment or to provide rollover loans for firms with operational difficulties.

### 3 Data and Empirical Strategy

#### 3.1 Survey of SMEs

The main dataset we use is a survey of small and medium enterprises in China, named the “Enterprise Survey for Innovation and Entrepreneurship in China” (ESIEC) and conducted by the Center for Enterprise Research at Peking University. Two national surveys were conducted in the field in 2018 and 2019. Two waves of a COVID-19 special survey of sample businesses in the previous years were conducted by telephone in February and May of 2020. Below, we describe the national and the COVID-19 surveys respectively.

**National Survey.** The ESIEC national survey takes a random stratified sample of firms from the Firm Registration Database of the State Administration for Industry and Commerce of China, which contains the universe of all newly registered firms in China between 2010 and 2017. The

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<sup>7</sup>A counter guarantee is type of guarantee, which can be paid in the form of a collateral, provided by firms to the credit guarantee agency. It is cashed if the firm defaults on its loans.

<sup>8</sup>From casual conversations with surveyed firm owners, the elimination of counter-guarantee requirement is viewed to be the most important because it protects firm owners from the risk of losing their collateral in the event of default.

<sup>9</sup>Results in this paper are robust to an alternative definition, which states that a city enacts credit guarantee support if it eliminates counter-guarantee requirements and decreases fees for guarantee services.

<sup>10</sup>Subsidy rates generally range from 30% to 50%, and the duration of the subsidy is between 6 to 12 months.

<sup>11</sup>The rate is generally between 20% to 80% for new loans borrowed in 2020.

sampling procedure is as follows. First, six nationally representative provinces and centrally-administered municipalities are selected. Second, counties that are provincially representative are selected based on population and total GDP. Five hundred firms are then randomly sampled from each county to form the final ESIEC sample of 6,628 firms.<sup>12</sup>

The ESIEC firms are representative at both the national and provincial level, and are spread across 62 cities in 6 provinces and centrally-administered municipalities: Shanghai, Liaoning, Zhejiang, Henan, Guangdong and Gansu.<sup>13</sup> In addition, the ESIEC sample is representative of the industry distribution of all firms from the Firm Registration Database, except for the wholesale and retail sector, which is deliberately under-sampled due to high level of homogeneity among retail firms.<sup>14</sup>

The 2018 wave covered 6,199 firms. The 2019 wave, which was a follow-up on firms that missed the 2018 wave, covered the remaining 429 firms. The baseline survey contains information about firms' annual sales, year of registration, employment, physical addresses, industry, and supply chain characteristics. They also contain information about firm owners' personal characteristics and entrepreneurship history.

**COVID-19 Survey.** In 2020, all 6,628 firms from the national survey were contacted by phone for a COVID-19 special questionnaire. The first wave of the survey was conducted between February 10 and 13, two weeks after all provinces and centrally-administered municipalities in China declared first-degree state of emergency in response to the COVID-19 outbreak. Interviewers were able to complete and retrieve a total of 2,044 responses. Questions were asked about firms' operational conditions, production activities, and the main challenges they faced.

The second wave was conducted between May 18 and 25, after most provinces downgraded their state of emergency to third-degree. Again, all 6,628 firms were contacted, and 1,961 responses were completed and retrieved. 63% of firms that responded to the February survey also responded to the May survey; and the two waves covered a total of 2,838 unique firms. Questions were asked about firms' operational recovery, the impact of COVID-19 on firms' suppliers and customers, the measures they took to adapt, and the types of government relief policies they did receive.

It should be noted that around two-thirds of the firms that appeared in the national survey did not respond to the COVID-19 survey. First, this is partially because the two surveys were conducted

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<sup>12</sup>The original sample contains 58,500 firms from 117 counties, but interviewers were only able to reach and elicit survey responses from 6,628 firms. Many unreachable firms had closed down but were not de-registered from the database.

<sup>13</sup>See Figure 1(b) in Appendix D for a map of the geographical distribution.

<sup>14</sup>See Figure 1(a) in Appendix D for a full comparison.



in different ways—telephone surveys naturally register a much lower response rate compared to field surveys. Moreover, some SME owners could become reluctant to complete the questionnaire when facing operational challenges induced by COVID-19, which might lead to sampling bias in our analysis. In Appendix B, we perform a balance check on the characteristics of SMEs that did and did not respond to the February survey, and discuss how the sampling bias can potentially affect our results.<sup>15</sup>

Table 1 reports summary statistics for key variables. Panel A displays the basic characteristics for SMEs in the February wave, and relevant variables are from the national survey. Panels B shows SMEs’ exposure to different types of local policies in February. Panel C displays SMEs’ self-reported policy coverage in May. Panel D displays the main outcome variables used in the analysis.

From Panel A, we can see that our sample firms are small in size and relatively young, which is unsurprising as they are newly registered between 2010 and 2017 by construction. Total revenue is considerably right-skewed with a median of 55, which is much smaller than the mean of 729.74. A relatively small proportion of firms had access to external financing, or are tenants at state-owned properties.<sup>16</sup> Moreover, Panels B and C show that a moderate share of firms are exposed to local economic and lock-down policies. The share for the rent reduction policy is quite small, since only 15% of firms in our sample are inferred to be state-property renters.

### 3.2 Empirical Strategy

Our baseline specification estimates the effects of local policies on SMEs’ outcomes:

$$Y_{ij} = \alpha + \beta^s P_{ij}^s + \gamma X_{ij} + \epsilon_{ij}. \quad (1)$$

Here,  $Y_{ij}$  denotes outcome variables for firm  $i$  located in city  $j$  that are constructed from the COVID-19 survey.  $X_{ij}$  is a vector of firm-level control variables that are taken from the ESIEC national survey and capture firms’ basic characteristics: total employment, annual sales, firm age, and whether firm  $i$  belongs to the service sector. To maintain a decent sample size, we impute missing values using indicator variables.

**Short-Run Policy Effects.** We utilize the February wave of the COVID-19 survey to study the

<sup>15</sup>We do not perform this exercise for the May survey because we use the PSM method to analyze medium-run policy effects.

<sup>16</sup>We infer property ownership using information on firms’ physical addresses, from the ESIEC national survey. Details of this exercise are included in Appendix C.

short-run effects of lock-down and stabilization. For lock-down policies, we mainly focus on two outcome variables: whether firm  $i$  has reopened by the February survey date; and whether firm  $i$  expects to resume operation within one month from the survey date, if it has not reopened yet. For stabilization policies, in addition to the two variables above, we also examine whether firm  $i$  has enough cash to sustain its operations for one month, which is a proxy for whether firm  $i$  is facing stringent short-term liquidity constraints.

$P_{ij}^s$ , which denotes local policy interventions, is equal to 1 if a specific policy  $s$  is introduced in city  $j$  (where firm  $i$  is located) by February 10. Our coefficient of interest is  $\beta^s$ , the estimated effect of policy  $s$  on firm  $i$ 's outcome. It should be noted that, for stabilization policies, our baseline analysis would provide estimates of the intention-to-treat (ITT) effects, as we only observe the availability of policy support in each city in February rather than actual policy assignments.

In the analysis of the impact of lock-down policies, we further include city-level infection rates in our regressions as they may directly affect local lock-down decisions as well as firms' operational decisions.

**Medium-Run Policy Effects.** We utilize the May wave of the COVID-19 survey to study the medium-run effects of stabilization policies. We mainly focus on three outcome variables: whether firm  $i$  has sufficient cash balance for one month of operations; second, whether firm  $i$  has reopened by the May survey date; and third, whether more than 50% of employees have returned to work, conditional on firm  $i$  having reopened.

Recall that major stabilization policies introduced by local governments were starting to be replaced by unified national policies since late February, and as a result, geographical policy variations no longer exist by May. Since the May wave asks firm owners whether they received specific policy support, we estimate medium-run policy effects by directly looking at the impact of actual policy coverage on firms' outcomes in May. That is,  $P_{ij}^s$  is equal to 1 if firm  $i$  in city  $j$  self-identifies as a recipient of policy  $s$ .

Since the assignment of policy support may be highly correlated with firms' characteristics, we adopt a propensity-score-matching (PSM) method to address potential selection bias. We use one-to-one nearest neighbor matching based on firms' basic characteristics (employment, sales, age, and service/non-service sector) as well as their geographical distance to Wuhan and industry proximity to Hubei Province. In contrast to the ITT effects of short-run policies, the PSM method here provides estimates of the average treatment on the treated (ATT) effects of stabilization policies in the medium-run.

## 4 Policies and SMEs' Responses

In this section, we first investigate how lock-down and stabilization policies introduced by city governments in February 2020 relate to SMEs' operating conditions and their owners' reopening expectations, as reported in the February wave of the COVID-19 survey. We then examine the medium-run impact of stabilization policies using the May wave of the survey.

### 4.1 Short-Run Effects

#### 4.1.1 Lock-Down Policies

We begin by demonstrating that both sets of lock-down policies, namely provincial highway closures and city-wide social-distancing, are negatively correlated with firms' reopening decisions and their expectations of reopening within one month, controlling for firms' basic characteristics, the severity of COVID-19 at the city-level, and the geographic and industry proximity to Hubei. The estimated effects of each lock-down policy are displayed in Figures 1(b) and 1(c).<sup>17</sup> We find that firms located in cities with strict social distancing rules are on average 8.4% less likely to reopen, and 12% less likely to plan on reopening in the next month. Similarly, the reopening rates of firms facing provincial highway closures are on average 14% lower than their counterparts, and the probability of reopening within one month is 13% lower. All estimated coefficients are statistically significant at the 5% level.

These findings indicate that lock-down policies not only impede SMEs' concurrent operational recovery, but also undermine their recovery expectations for the near future, which may lead to prolonged economic loss. Our results directly connect with [Alexander and Karger \(2020\)](#) and [Allcott et al. \(2020\)](#), who demonstrate that stay-at-home orders lead to declines in consumer spending and shop visits. We take the analysis one step down the chain, and show that the effects of local and regional lock-downs can further propagate to the production side and disrupt SMEs' operations.

One potential channel through which the lock-down policies affect firms' reopening decisions by restricting firms' market access: the close-down of residential communities and shut-down of local public transport reduce the incidence of face-to-face transactions, and highway closures increase the transportation costs of delivering to distant customers. If the impact of lock-down policies operates through the negative demand shocks, then the effects of city-level social distancing policies should be smaller for online sellers because those sellers rely less on face-to-face transactions, and the effect

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<sup>17</sup>See Appendix D for regression tables.

of provincial highway closures should be greater for firms with larger non-local sales as inter-city transportation becomes more costly.

We examine the above hypothesis using heterogeneity analysis, where we estimate Equation 1 separately for each subsample of firms. Figure 2(a) shows that both online and offline sellers<sup>18</sup> are negatively affected by social distancing policies in their reopening decisions and expectations. Nonetheless, the coefficient magnitudes are qualitatively lower for the online sellers. We then divide our sample to firms whose biggest customer is non-local, and firms that serve a more local or diversified customer base.<sup>19</sup> Figure 2(b) shows that, even though both groups of firms exhibit lower reopening rates and weaker willingness to reopen soon when facing highway closures, the negative effect on reopening decisions is statistically significantly larger for firms whose biggest customer is non-local. The effect on reopening expectations is also qualitatively larger for those firms. While unable to rule out other explanations for the lock-down policy effect, these results suggest that negative demand shocks induced by lock-downs are a crucial factor that enters into SMEs' reopening decisions and expectations, echoing with Balla-Elliot et al. (2020).

#### 4.1.2 Stabilization Policies

Stabilization policies can be further divided into two types: non-financial policies that directly improve SMEs' short-term cash flows, including deferrals of social security payments and rent reductions; and financial policies that provide support to SMEs through the banking system, such as the lowering of credit guarantee thresholds and subsidies on interest payments. We find that those two types of policies produce very different effects: while the former alleviates firms' short-term cash constraints and accelerates firms' operational recovery, the latter has little or no impact on those outcomes.

**Social Security Deferrals and Rent Reductions.** Our regression analysis suggests that, deferrals of social security payments and exemptions of rent payments both reduce SMEs' short-term cash constraints. Moreover, firms that benefit from social security deferrals are more likely to reopen in early February or to plan on reopening within one month. Figure 1(a) shows that the social security deferral policy decreases the probability of cash shortage by about 5.5%,<sup>20</sup> and that

<sup>18</sup>The ESIEC national survey asks whether firms made revenue from online sales. We define a firm to be an online-seller if it has nonzero online sales.

<sup>19</sup>The ESIEC national survey asks: 1) whether the firm has big customers, and 2) if so, whether the biggest customer is local. We define a firm as selling to major non-local customer if the firm has nonzero big customers, and the biggest customer is non-local.

<sup>20</sup>This result is similar to Granja et al. (2020), who find that the Paycheck Protection Program allowed firms to build

the rent reduction policy decreases this probability by 12% for tenants at state-owned properties. Figure 1(b) and Figure 1(c) further demonstrate that social security deferral raises the probability of reopening by 7.2%, and the probability of expecting to reopen in one month by 11%. Rent reductions, however, are not associated with any statistically significant differences in the reopening decisions and expectations of firms renting state-owner properties. These findings imply that, direct deferrals or exemptions of scheduled payments can improve firms' short-term cash flow, and ones that are related to labor costs may further stimulate firms' operational recovery.

To better understand the effect of social security deferral policies on the operations of SMEs, we further divide our sample into two groups: skill-intensive and non-skill-intensive firms.<sup>21</sup> Conceptually, firms with a larger share of high-skilled workers may benefit more from deferrals of social security payments for the following reasons. First, they face higher social security expenses per worker, and are subject to more stringent payment obligations as required by formal employment contracts, which are more likely to apply to well-educated workers (Liang et al., 2016). Second, their operational decisions may be more sensitive to labor cost shifts, because high-skilled workers are more flexible in their work arrangements (Mongey et al., 2020).

The prediction above is tested in Figure 2(c), and three findings emerge. First, under social security deferral policies, skill-intensive firms are significantly less likely to face short-term cash constraints, while their counterparts exhibit little difference in reopening rates. Second, skill-intensive firms are more likely to reopen, while this effect is limited and statistically insignificant for non-skill-intensive firms. Third, while the effect on reopening expectations is statistically more significant for non-skill-intensive firm, the magnitudes of the effects are indistinguishable. These results suggest that the effectiveness of labor-cost-related support policies depends on firms' labor force composition, such as skill intensity or formality of employment. SMEs with low-skilled and potentially informal employment are not only more vulnerable under the pandemic, as shown in Alfaro et al. (2020), but also less sensitive to major employment stabilization policies.

**Financial Support.** Last, as shown in the regression analysis, the various forms of financial support do not seem to have achieved their policy goals. Figure 1(a) shows that, firms located in cities that adopted reductions in credit guarantee requirements or loan support programs do not exhibit improved cash flow conditions. Similarly, those policies also exhibit little correlations with

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up liquidity.

<sup>21</sup>The ESIEC national survey asks each firm for their total number of employees and number of employees with college degree or above. We define a firm as skill-intensive if the percentage of college degree workers at this firm is above the sample mean.

firms' reopening decisions and plans, as presented in Figures 1(b) and 1(c). All coefficient estimates are statistically insignificant and close to zero in magnitude.

It could be the case that financial support policies disproportionately benefit SMEs with severe cash constraints, and produce negligible effects on others<sup>22</sup>. To examine this possibility, we further divide our sample into two groups, based on whether firms are likely facing stringent cash constraints. Conceptually, firms with positive account receivables on the balance sheet are more exposed to cash flow constraints during economic downturns due to higher default risks. The effects of financial support policies, if any, should be more pronounced for those firms.

We investigate whether firms with positive account receivables prior to the pandemic respond differently to the credit guarantee policies.<sup>23</sup> As shown in 2(d), the effects of reducing credit guarantee requirements on firms' cash flows and reopening decisions remain statistically insignificant and small in magnitude regardless of whether the firm record positive account receivables. Results are similar for loan support policies (not reported in the paper), suggesting that financial policies in general are unsuccessful in targeting SMEs with more urgent liquidity demands and thus are insufficient to support the recovery of SME activities.

### 4.1.3 Robustness Checks

We demonstrate that our main results are robust to a larger set of control variables and that they are not driven by possible unobserved confounders.<sup>24</sup> In the baseline specification, our controls comprise of firm-level characteristics, namely employment, annual sales, firm age, and whether the firm belongs to the service sector.

We first introduce two control variables to account for possible spillover effects from Wuhan and the Hubei Province, which are the original epicenter of the pandemic. We compute the travel time between Wuhan and city  $i$ , as firms may be affected by emergency measures undertaken in Hubei (Fang et al., 2020); and a proxy that measures firm  $i$ 's dependence on upstream industries in Hubei, as firms that rely on intermediate inputs produced in Hubei may face supply-chain interruptions. Tables A7 and A8 in the Appendix suggest that the effects of social-distancing and stabilization policies remain largely unchanged.

For social-distancing policies, we further control for the opening rate of provincial highways to

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<sup>22</sup>Several studies, such as Fahlenbrach et al. (2020) and Campello et al. (2020), suggest that the effects of COVID-19 shocks on firms' financial performance and employment are heterogeneous and depend on firms' financial conditions.

<sup>23</sup>The ESIEC national survey asks whether firms have any account receivables. The variable is directly used to define the groups in this analysis.

<sup>24</sup>Details of the data sources and the construction of those control variables are included in Appendix C.

account for the effects of inter-city traffic conditions. While the baseline result for the probability of reopening disappears, the result for the probability of reopening within the next month is unaffected (see Table A7).

For stabilization policies, we control for city-level economic variables—GDP per capita and the ratio of fiscal expenditure to fiscal revenue—since the implementation of stabilization policies depend on local economic conditions as well as the governments’ fiscal budget. To address the effects of alternative policies, we also include a measure of policy intensity, which is the number of other stabilization policies that are enacted by the same city. As shown in Table A8, our baseline results are robust to the addition of those variables.

## 4.2 Medium-Run Effects of Stabilization Policies

As discussed previously, the introduction of nationwide stabilization policies began to take place in late February. Here, we examine how those policies affect firms’ operational conditions in May. The PSM method provides estimates of the average treatment effect on the treated (ATET) for each stabilization category.<sup>25</sup> As shown in Table 2, the effect of social security exemptions or employment stabilization subsidies on SMEs’ short-term cash constraints remains negative but is no longer statistically significant. Meanwhile, those policies improve the reopening probability of treated firms’ by about 8.5%, and the probability of having a majority of employees return to work by about 10.1%. Rent and utility reductions significantly reduce treated firms’ probability of facing short-term cash constraints by 12.8%, but do not significantly improve their reopening and labor recovery rates. Last, the effects of credit and loan support on firms’ outcomes are again statistically insignificant and small in magnitude. Our findings suggest that the medium-run effects of stabilization policies are generally in line with their short-run effects.

## 5 Discussion

Our findings highlight the sharp contrast between the effects of financial and non-financial policies. Non-financial policy support, namely social security deferrals and rent reductions, can alleviate firms’ cash flow shortage; and the former further encourages the recovery of SMEs’ business activities. On the other hand, financial support has little impact on firms’ cash balance and operational decisions in both the short-run and the medium-run.

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<sup>25</sup>Table A6 shows that differences in covariates between treatment and control groups are significantly reduced after matching.

Differences in the effectiveness of the policies can be attributed to two factors: accessibility and misallocation. First, most non-financial policies are in the form of payment deferrals or exemptions, which automatically apply to all qualified SMEs and become effective almost immediately. In contrast, the complexity in the application process for bank loans was highlighted by a number of survey respondents as a practical obstacle to obtaining outside credit. Differences in policy accessibility are also reflected in SMEs’ self-reported policy coverage: about 41.8% firms surveyed in May acknowledged receiving social security exemptions or employment stabilization subsidies, but the percentage is only 15.7% for credit and loan support.<sup>26</sup> Second, several respondents reported that SME loans were mainly granted to firms with connections to the banks or the local government.<sup>27</sup> Hence, the marginal benefits of loans are low for those recipients because they were likely to have enjoyed other policy support both before and during the pandemic. The misallocation channel, which is known to generate inefficiencies (Hsieh and Klenow, 2009; Midrigan and Xu, 2014), can explain the insignificant treatment-on-the-treated effects of financial support policies.

We provide suggestive evidence that accessibility or misallocation of credit support may have reduced the effectiveness of credit policies. The May wave of the survey allows us to find a subsample of SME owners who believe credit policies to be very important for the operation of their businesses.<sup>28</sup> That is, their firms have a high demand for credit. We perform PSM analysis of credit policies for this subsample, and find that while those policies do not produce statistically significant effects on SMEs’ reopening and labor recovery rates, they do alleviate SMEs’ cash constraints in the medium-run (see Table A9). This finding suggests that our baseline result, where credit policies are ineffective at improving SMEs’ short-term liquidity, is driven by the set of firms that received but did not need credit.

Another puzzle that emerges from our findings is that, while both social security deferrals and rent reductions improve SMEs’ cash flows, only the former stimulates the recovery of SME activities. We propose two hypotheses to explain this result. First, rent reductions decrease SMEs’ fixed costs, while social security deferrals decrease variable costs of production. Theoretically, reductions in fixed costs will not affect SMEs’ shutdown decisions in the short-term as profit margins remain

<sup>26</sup>This is in line with Poncet et al. (2010), who illustrate that private firms in China experience the highest degree of financial constraints, whereas state-owned enterprises and foreign firms face no constraints. As all our sample firms are private-owned, it is highly possible that they face stringent financial constraints.

<sup>27</sup>This is consistent with Li et al. (2008), who find that connections to the government, measured by Party membership, help entrepreneurs obtain bank loans.

<sup>28</sup>A question in the survey asks whether respondents believe credit policies to be important for business operations, and respondents can select from the following options: unimportant, moderately important, and very important. We restrict our sample to respondents who selected the last option.



unchanged. Meanwhile, reductions in variable costs and the subsequent increase in profit margins will partially offset the negative demand shocks and stimulate resumption of production.<sup>29</sup> Second, rent reduction policies only apply to renters of state-owned properties, most of which are industrial parks and large-scaled complexes or buildings. The property management would have a strong incentive to align their reopening arrangements with the objectives of the central government, which can override their tenants' intention to reopen. Unobserved factors as such can distort SMEs' incentives and decisions.

## 6 Conclusion

This paper studies the effects of lock-down and stabilization policies on the recovery of SMEs' activities in China during the COVID-19 pandemic. We combine hand-collected policy schedules with SME survey data to assess the immediate impact of local policy interventions, and apply a propensity score matching method to examine the medium-run effects of national stabilization policies on SMEs' operations. We find that lock-down policies such as social distancing and highway closures suppress the recovery of SMEs' activities through limiting their access to the market. Stabilization policies which directly reduce operating expenses, including social security payment deferrals and rent reductions, significantly increase SMEs' probability of re-opening, accelerate their resumption of operations, and improve their cash flow conditions. In contrast, financial support policies that provide external financing opportunities, such as lowering credit guarantee thresholds and providing loan subsidies, do not appear to be effective in alleviating SMEs' economic distress.

Our findings provide preliminary but important insights on policy-making in response to COVID-19. First, our results suggest that lock-down policies are a double-edged sword: while effective at reducing health risks, they inevitably hinder the recovery of small businesses and incur economic loss. Second, our study highlights that direct payment deferrals and exemptions can be more effective than financial policies in supporting small businesses, in the context of the Chinese economy. Differences in policy effects may arise from the accessibility of policy benefits and inefficiency in resource allocation. Recognition of those fundamental mechanisms can help improve policy responses to COVID-19.

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<sup>29</sup>When asked to provide the main reason for not being able to resume production in the May wave of the survey, over 70% of respondents chose "decline in demand/orders", and only 18% owners chose "shortage of cash". This suggests that market demand is the main factor in SMEs' reopening decisions. This is consistent with [Balla-Elliott et al. \(2020\)](#), who find that delays in reopening can be explained by low levels of expected demand.

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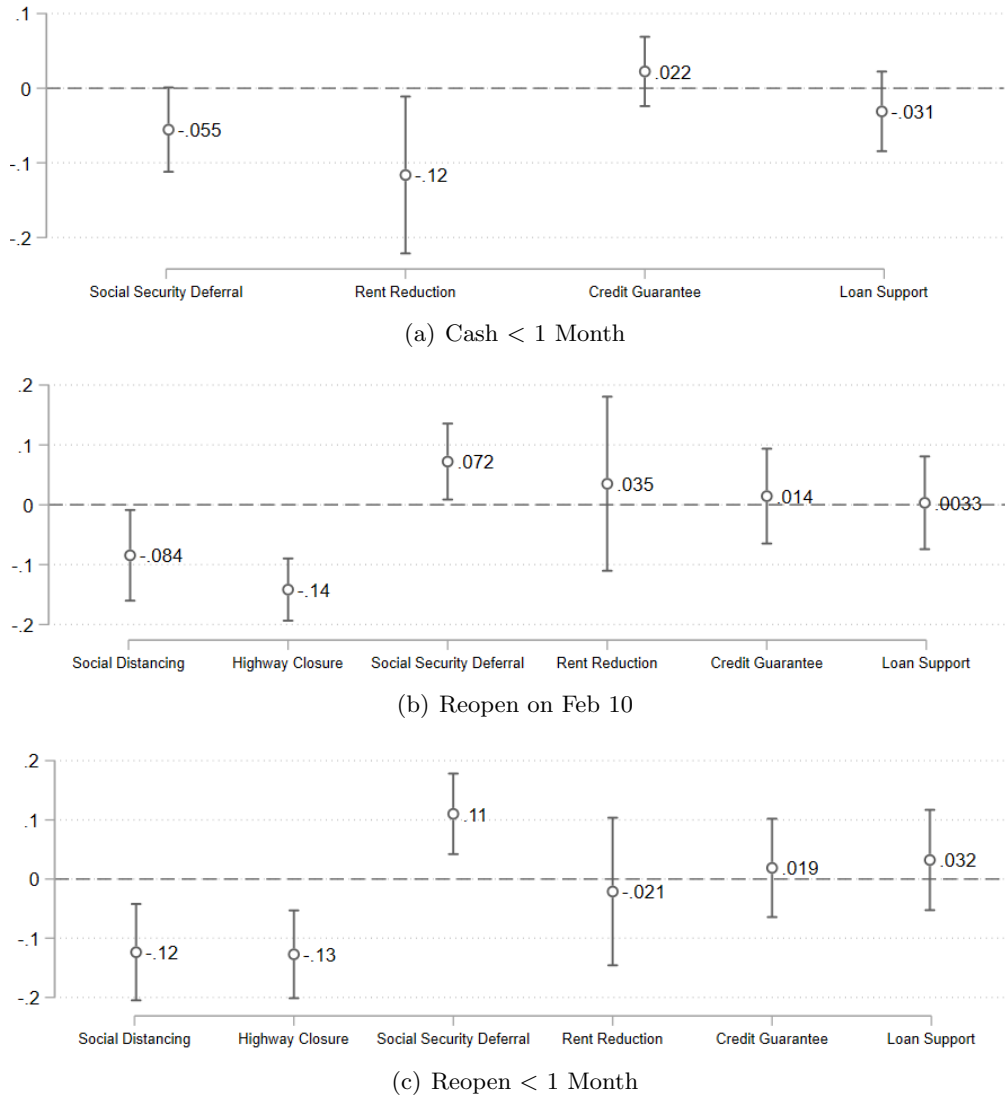
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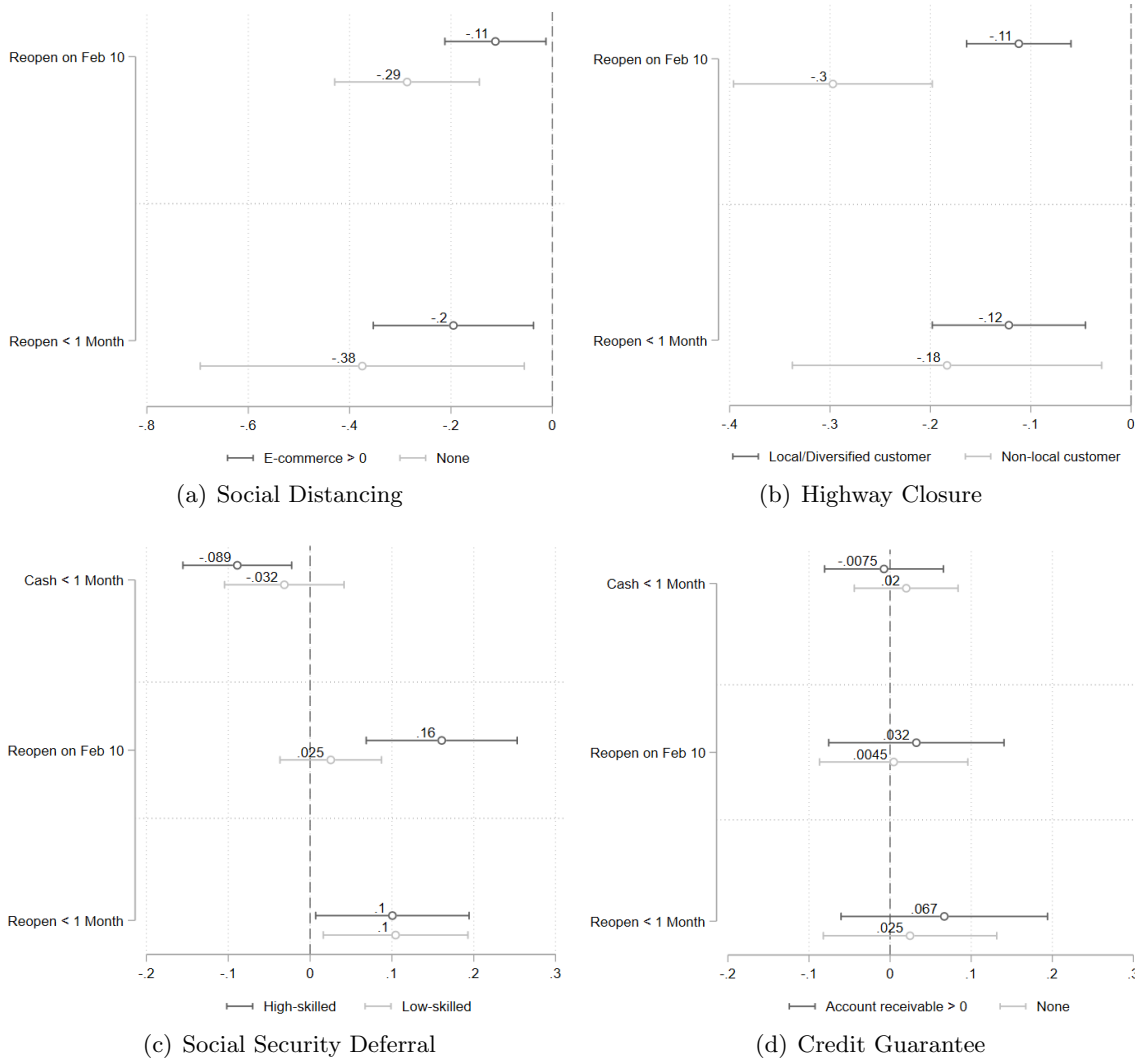
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Figure 1: Local Policy Interventions and SMEs' Responses



*Note:* The figures display the estimated effects of local policy interventions on SMEs' survey responses. They examine two sets of policy interventions: lock-down policies, including social distancing and highway closure; and stabilization policies, including social security deferral, rent reduction, credit guarantee and loan support. Figure (a) shows the estimated effects on whether the firm holds less than one month of cash; Figure (b) shows the estimated effects on whether the firm had reopened on February 10; Figure (c) shows the estimated effects on whether the firm expects to reopen within one month, if it has not yet reopened. Bars depict 95 percent confidence intervals.

Figure 2: Heterogeneous Effects of Local Policy Interventions



*Note:* The figures display the heterogeneous effects of local policy interventions on SMEs' survey responses. Figure (a) shows the effects of social distancing policies by whether the firm reports making online sales; Figure (b) shows the effects of highway closure policies by whether the firm's biggest customer is non-local; Figure (c) shows the effects of social security deferral policies by whether the firm has an above-average percentage of high-skilled workers; Figure (d) shows the effects of credit guarantee policies by whether the firm has positive account receivables on its balance sheet. Bars depict 95 percent confidence intervals.

Table 1: Summary Statistics for Surveyed Firms

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>Std. Dev.</b>
<i>Panel A: Firm Characteristics (February Wave)</i>			
Firm Age	2,044	5.05	2.25
Number of Employees	1,857	17.27	85.05
Total Revenue (10,000 RMB)	1,245	729.74	4996.52
Whether Firm Received External Financing in 2018	1,355	0.20	0.40
Whether Firm Has Account Receivables	1,599	0.39	0.49
High-Skilled Worker (Percent)	1,774	0.29	0.38
Whether Firm Rents State-Owned Property	2,035	0.15	0.36
Whether Firm Made Online Sales	570	0.68	0.47
Whether Largest Customer is Local	749	0.61	0.49
Trade Volume with Largest Customer (Percent)	1,557	15.52	24.84
<i>Panel B: Local Policy Coverage (By February 10)</i>			
Highway Closure	2,044	0.61	0.49
Social Distancing	2,044	0.13	0.34
Social Security Payment Deferral	2,044	0.51	0.48
Rent Reduction for State-Owned Property	2,044	0.10	0.38
Credit Guarantee Support	2,044	0.24	0.43
Loan Support	2,044	0.44	0.50
<i>Panel C: Self-Reported Policy Coverage (May Wave)</i>			
Social Security Exemption or Employment Stabilization Subsidies	1,711	0.42	0.49
Rent or Utilities Reductions	1,711	0.26	0.44
Credit and Loan Support	1,711	0.16	0.36
<i>Panel D: Outcome Variables</i>			
Cash Flow Is Less than 1 Month (February)	1,466	0.19	0.40
Cash Flow Is Less than 1 Month (May)	1,711	0.17	0.37
Open on Survey Date (February)	1,861	0.19	0.39
Open on Survey Date (May)	1,953	0.79	0.41
Expect to Re-Open within 1 Month (February)	1,504	0.39	0.49
Whether Firm Has More Than 50% Employees Return to Work	1,953	0.64	0.48

*Notes:* This table displays summary statistics of key variables.



Table 2: Matching Results for Medium-Run Policy Effects

<i>Panel A: Social Security or Employment Stabilization Subsidies</i>			
	Cash < 1 Month	Reopen	Labor Recovery > 50%
Treatment group	0.158	0.936	0.855
Control group	0.174	0.878	0.793
ATT	-0.049 (0.030)	0.0850*** (0.0248)	0.101*** (0.031)
Number of matched pairs	716	716	670
<i>Panel B: Rent or Utilities Reductions</i>			
	Cash < 1 Month	Reopen	Labor Recovery > 50%
Treatment group	0.110	0.945	0.835
Control group	0.206	0.931	0.816
ATT	-0.128** (0.058)	0.018 (0.345)	0.107 (0.083)
Number of matched pairs	109	109	103
<i>Panel C: Credit or Loan Supports</i>			
	Cash < 1 Month	Reopen	Labor Recovery > 50%
Treatment group	0.127	0.922	0.830
Control group	0.175	0.900	0.818
ATT	-0.055 (0.035)	0.040 (0.028)	-0.0300 (0.0346)
Number of matched pairs	268	268	247

*Note:* This table reports the estimated average treatment-on-the-treated (ATT) effects of national stabilization policies on SMEs' outcomes, based on the propensity score matching (PSM) method. The matching covariates include SMEs' basic characteristics (sales, employment, age, service sector indicator), geographical distance to Wuhan, and industry dependence on Hubei Province. Panel A shows the effects of social security or employment stabilization subsidies; Panel B shows the effects of rent or utility reductions; Panel C shows the effects of credit or loan supports. Robust standard errors are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## Appendix A Additional Details on Policies

This section presents supplementary details on policy coding and implementation across cities.

### A.1 Policy Coding Rule

The Chinese government consists of a multi-level hierarchy, three levels of which are engaged in policy-making: the central, the provincial level and the city-level (or prefecture level). Provincial and city governments are responsible for a wide range of regional matters, and are highly autonomous in the management of local economies (Xu, 2011). Since China is a large country with substantial regional heterogeneities, the central government usually announces policy guidelines and recommendations for the regional governments, which then issue their own policy implementation procedures that account for local needs and constraints.

We hand-collect information on provincial and city-level lock-down and stabilization policies from official announcements and news reports. While some policy items dictate mandatory action, others merely recommend potential courses of action. We define the former to be *policy directives*, and the latter to be *policy advice*, and assume that only policy directives will be dutifully enacted.<sup>30</sup> That is, in our analysis, we restrict our attention to policy directives only, and use the terms “policy” and “policy directive” interchangeably.

In our definition, a policy directive contains imperative keyword(s),<sup>31</sup> as well as a specific numerical goal, such as the number of months for which an exemption is to be applied or the rate at which loans are to be subsidized. Below, we provide one example of a directive and an advice to illustrate their differences.

1. Directive: SMEs that rent real estate property from state-owned enterprises for production and business activities will be exempted from paying two months of rent for February and March.<sup>32</sup>
2. Advice: every state-owned credit guarantee agency should offer fee exemptions to businesses

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<sup>30</sup>Pure policy announcements are found to be ineffective in changing households beliefs, as in Coibion et al. (2020).

<sup>31</sup>We compile a list of commonly-used keywords in the policy announcement articles, and determine the imperative keywords to be: will do, will in principle do (*yuanze shang*), will push forward (*tuidong*), will ensure (*quebao*), will strive to achieve (*lizheng*). Non-imperative keywords are: should do (*yingdang*), is encouraged to do (*guli*), can do (*keyi caiqu*), will give support for (*dui... zhichi*).

<sup>32</sup>Shanghai City Government. “Shanghai’s Policy Initiatives for pandemic Prevention and Support for Businesses’ Stable and Healthy Development.” Shanghai.gov.cn. <http://www.shanghai.gov.cn/nw2/nw2314/nw32419/nw48614/nw48617/u21aw1424000.html> (accessed May 23, 2020).

that are severely impacted by the pandemic.<sup>33</sup>

We then use both provincial and city announcements to determine which policies will be enacted at the city-level. In the simplest case, a policy has the same articulation in both announcements, and we assume it will be enacted in this form. If a policy is articulated differently in each announcement, we assume that it will be enacted according to the city-level articulation. Lastly, if a policy appears in the provincial, but not in the city announcement, we assume that it will be enacted according to the provincial articulation.<sup>34</sup>

## A.2 Policy Implementation

Table A1 below displays the cities that have enacted highway shutdown, social distancing, rent reduction, social security deferral and credit guarantee threshold policies on or before February 10, 2020.

Table A1: Policy Implementation Across Cities

City	Highway	Social Distancing	Rent	Social Security	Credit	Loan
Shanghai			✓	✓		✓
Hangzhou	✓		✓	✓		
Ningbo	✓	✓	✓	✓		✓
Wenzhou	✓	✓	✓	✓		
Jiaxing	✓		✓			✓
Shaoxing	✓		✓	✓	✓	✓
Jinhua	✓		✓		✓	✓
Quzhou	✓		✓			
Taizhou	✓	✓	✓			✓
Guangzhou			✓	✓	✓	✓
Shaoguan				✓	✓	
Shenzhen			✓	✓	✓	✓
Zhuhai			✓	✓		✓
Shantou				✓		✓
Foshan			✓	✓		

<sup>33</sup>Ushui. “Opinions of the People’s Government of Jiaxing on pandemic Response and Support for Businesses’ Stable and Healthy Development.” USHUI.net. <http://www.ushui.net/law/v?id=v79f3c1v0102114ddf5bc3fe0a7a0b700341cf6dfa4adcd0a550> (accessed May 23, 2020).

<sup>34</sup>Similarly, for cities that have not issued their own announcements as of February 10, we assume that policies will be enacted according to the provincial articulation, if such articulation exists. In other words, we assume that SME owners expect city governments to follow provincial directives.

City	Highway	Social Distancing	Rent	Social Security	Credit	Loan
Jiangmen				✓	✓	
Zhanjiang				✓	✓	
Maoming			✓	✓		
Zhaoqing				✓	✓	
Huizhou				✓	✓	
Meizhou				✓	✓	
Shanwei			✓	✓		✓
Heyuan				✓	✓	
Yangjiang				✓	✓	
Qingyuan				✓	✓	
Dongguan			✓	✓	✓	✓
Zhongshan			✓	✓		✓
Chaozhou				✓	✓	
Jieyang				✓		
Yunfu				✓		
Zhengzhou	✓					
Kaifeng	✓		✓			
Luoyang	✓		✓		✓	✓
Pingdingshan	✓					
Anyang	✓					
Xuchang	✓		✓		✓	✓
Luohe	✓		✓		✓	
Nanyang	✓	✓				
Shangqiu	✓		✓	✓		✓
Xinyang	✓	✓				
Zhoukou	✓					
Zhumadian	✓					
Jiyuan	✓					
Shenyang	✓					
Dalian	✓		✓	✓		
Anshan	✓		✓		✓	✓
Dandong	✓		✓			✓
Yingkou	✓		✓			✓
Fuxin	✓		✓			✓
Liaoyang	✓		✓			✓

City	Highway	Social Distancing	Rent	Social Security	Credit	Loan
Huludao	✓		✓			✓
Lanzhou	✓					
Baiyin	✓	✓				
Tianshui	✓					
Wuwei	✓	✓				
Zhangye	✓					
Pingliang	✓					
Jiuquan	✓					
Qingyang	✓	✓				
Dingxi	✓			✓		
Longnan	✓					✓
Gannan	✓					

## Appendix B Sampling Bias

This section examines sampling bias in the February wave of the COVID-19 survey, and discusses how it can affect the baseline results.

To do so, we regress SMEs’ response behavior in the February COVID-19 survey on a set of SME characteristics taken from the ESIEC national survey. We make sure to include the four variables used in our heterogeneity analysis. Results are displayed in Table A3. While most variables are uncorrelated with SMEs’ survey responses, coefficients on external financing, E-commerce, high-skilled workers and account receivables turn out to be statistically significant. Below, we discuss each of the four sampling issues in greater detail.

First, SMEs that obtained external financing in 2018 are more likely to respond to the survey. Since those SMEs have greater reliance on external credit, they should benefit more from credit support programs in February 2020. In other words, our baseline result that credit policies are ineffective is already upward-biased, and this sampling issue should not affect the interpretation of our results.

Second, SMEs that engage in E-commerce—that is, they have positive online sales—are less likely to respond to the survey. According to Figure 1, those firms are less affected by lock-down policies. Thus, our baseline result that lock-down policies negatively affect reopening behavior

and expectations is again upward-biased, and this sampling issue should not affect our results qualitatively.

Third, SMEs that have an above-average share of high-skilled workers are more likely to respond to the survey. According to Figure 1, those firms benefit more from social security deferrals in comparison to SMEs with a below-average share of high-skilled workers—they see bigger improvements in short-term liquidity and report a higher chance of reopening. This sampling issue can potentially compromise our baseline results on the effects of social security deferrals, which are favorably biased by the over-representation of firms with a larger share of high-skilled workers. Results from the heterogeneity analysis, on the other hand, still hold.

Last, SMEs with positive account receivables are more likely to respond to the survey. According to Figure 1, credit policies do not affect firms with positive and zero account receivables differently. Hence, this sampling issue does not change the interpretation of our baseline results.

## Appendix C Additional Variable Definitions

This section includes supplementary details on variable construction.

**City-level Economic Variables.** Total GDP, population, fiscal revenue and expenditure are extracted from the 2018 city statistical yearbooks, which are officially published by China’s National Bureau of Statistics and cover all cities and counties in China. We compute GDP per capita using the ratio between total GDP and population, and use the ratio of fiscal expenditure to revenue to measure the budget of city governments.

**Highway Opening Rate.** Data on highway opening rates is provided by G7, a fleet management service provider in China that offers IoT/AI services to over 800,000 vehicles. Opening rate is defined as the ratio between the intensity of road freight transport in February 2020 and the intensity of road freight transport in December 2019, where the intensity of road freight transport is measured using satellite images.

**Infection Rate.** Daily data on the number of confirmed COVID-19 cases for each city since late January are extracted from official announcements. We aggregate the number of cases up to February 10, and divide it by city population to obtain a measure of local COVID-19 infection rate.

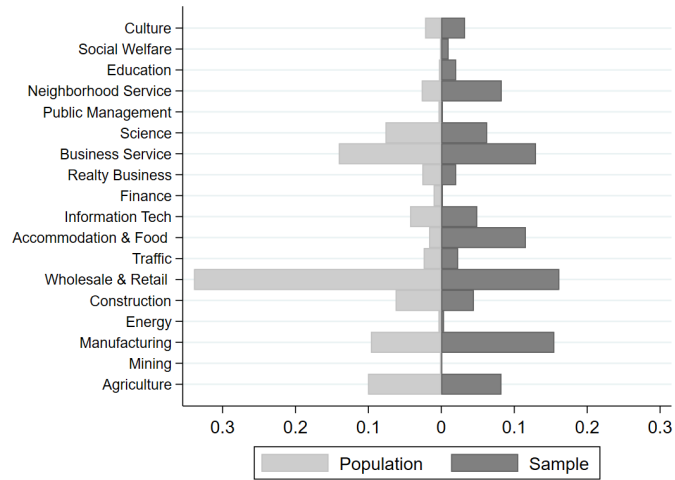
**Geographical Distance to Wuhan.** We use Baidu Map to infer the shortest travel time by car from each city in our sample to the city of Wuhan.

**Industry Dependence on Hubei Industries.** We use the 2012 Input-Output Table (IO Table) and the 2013 Annual Survey of Industrial Enterprises (ASIE) provided by the National Bureau of Statistics to compute each industry’s dependence on the upstream industries in Hubei. We first compute the percentage of outputs from Hubei Province in the total output of each industry based on ASIE data. We then compute the product of the vector of input shares of each industry (from the IO Table), and the vector of Hubei’s percentage of output in each upstream industry (from the ASIE data). The measure provides us an estimate of the percentage of inputs from Hubei province in each industry.

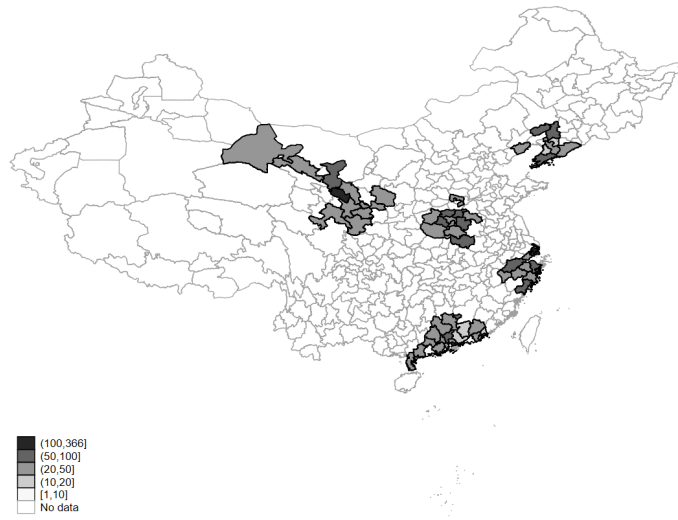
**Property Ownership.** We infer property ownership using firms’ address information in the ESIEC dataset. We first extract names of plazas and business and industrial complexes from these addresses. If a name contains keywords such as technology parks and development zones, which are usually developed and run by the local government, then we assume it is state-owned property. A full list of such keywords is as follows: parks, technology parks, software parks, entrepreneur parks, industrial parks, science cities, incubators, enterprise bays, science and innovation centers, clusters, development zones, and experimental zones. If a name contains brand names of private real estate developers such as Wanda, Wanke and Hengda, then we know it is private property. For remaining addresses, we manually locate them using Baidu Map, which is the Chinese counterpart of Google Map. If they belong to a plaza, marketplace or business/industrial complex, we search for the ownership information of companies that developed and/or are operating these places using Tianyancha.cn (a data search platform for information on Chinese enterprises). If such information does not exist, then we assume the property is privately-owned.

## Appendix D Additional Figures and Tables

Figure A1: Industry and Geographical Distribution of Sample Firms



(a) Industry Distribution



(b) Geographical Distribution

*Note:* Figure (a) displays the industry distribution of firms in the ESIEC dataset and of all firms in the Firm Registration Database. Figure (b) shows the geographical distribution of firms in the analysis.



Table A2: Examples of Policies in Other Countries and Regions

	Social Distancing Policies	Economic Policies
U.S.	Stay-at-home order	Paycheck Protection Program (Under CARES Act) Deferral of social security payroll taxes
U.K.	Gathering limits Entertainment venues closed Stay-at-home order	The coronavirus job retention scheme (80% of wages) Deferral of VAT payments due to COVID-19 The Small Business Grant Fund (SBGF): cash grant of £10,000
France	Stay-at-home order Close-down of all non-essential locations	110 billion emergency plan Deferrals of social and/or tax payments Direct tax rebates Deferral of rental payments Rescheduling of bank credits
Germany	Non-essential public services closed Public gatherings banned Stay-at-home order (only for a short time)	Short-time working allowance (over 60% of the missing net wage, full reimbursement of social security contributions) The KfW fast loans for SMEs Grants for micro-enterprises and self-employed persons
Japan	Stay-at-home order (Suggested) close-down of entertainment venues	Business subsidy programs Financial supports (loans and guarantees) Employment adjustment subsidies Deferrals of national tax payments
Korea	Entertainment venues closed Public gatherings banned	Emergency Fund to encourage firms to retain their employees Government guarantees and insurance on loans. Tax credits for rental business owners who made rent cuts for commercial buildings Income and corporate tax reductions for SMEs in special disaster areas VAT reductions
Hong Kong	(Some) entertainment venues closed Public gatherings banned	Reduction of tax payable Deferring tax payments Employment Support Scheme Job creation and job advancement Government rental concessions, fee waivers, provision of loans and loan repayment deferrals to reduce financial burdens
Singapore	Gathering limits Entertainment venues closed Non-essential workplaces closed Stay-at-home order	Jobs Support Scheme Rent and loan deferral Enterprise Singapore's SME Working Capital Loan scheme and Temporary Bridging Loan Programme under the Unity Budget

*Notes:* This table provides a summary of policies implemented by some other countries and regions, including the United States, the United Kingdom, France, Germany, Japan, Korea, Hong Kong, and Singapore. Sources of information include newspapers, government reports, and professional summaries.

Table A3: SMEs' Characteristics and their Responses to the COVID-19 Survey

	Whether SME Responded to February Survey
Sales	0.003 (0.004)
Employment	-0.006 (0.005)
Age	-0.002 (0.003)
External Financing in 2018	0.059*** (0.022)
Number of Big Suppliers	0.001 (0.008)
Number of Big Customers	0.010 (0.006)
Engages in E-Commerce	-0.050* (0.028)
High-Skilled Workers Above Average	0.034** (0.016)
Biggest Customer is Local	-0.015 (0.020)
Has Account Receivables	0.026* (0.015)
Observations	6,653
R-Squared	0.023

*Note:* This table reports correlations between SMEs' characteristics and whether they responded to the first wave of the COVID-19 survey in February. Regression controls for industry and province fixed-effects. Robust standard errors are clustered at city level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A4: Effects of Lock-Down Policies

		<i>Panel A. Effects of social distancing policies</i>					
		Reopen		Reopen < 1 Month		E-Comm = 0	
	(1)	(2)	(3)	(4)	(5)	(6)	
Social Distancing	-0.084** (0.038)	-0.112*** (0.050)	-0.287*** (0.070)	-0.124*** (0.041)	-0.195** (0.079)	-0.375** (0.157)	
Sample	All	E-Comm > 0	E-Comm = 0	All	E-Comm > 0	E-Comm = 0	
Observations	1,806	350	176	1,460	277	131	
R-Squared	0.029	0.034	0.158	0.061	0.091	0.145	

		<i>Panel B. Effects of highway closure policies</i>					
		Reopen		Reopen < 1 Month		Local/Div Customer Non-local Customer	
	(1)	(2)	(3)	(4)	(5)	(6)	
Highway Closure	-0.142*** (0.026)	-0.112** (0.026)	-0.297*** (0.049)	-0.127*** (0.037)	-0.122*** (0.038)	-0.183** (0.077)	
Sample	All	Local/Div Customer	Non-local Customer	All	Local/Div Customer	Non-local Customer	
Observations	1,806	1,534	272	1,460	1,250	210	
R-Squared	0.050	0.036	0.164	0.066	0.059	0.123	

*Notes:* This table reports the estimated effects of lock-down policies on SMEs' reopening status by the survey dates, and whether they expect to reopen in one month, if not reopen yet. Columns 1 and 4 report estimates for all sample firms; columns 2, 3, 5, and 6 report estimates for subsamples of firms. All regressions control for SMEs' basic characteristics (sales, employment, age, and service-sector fixed effect) and city-level infection rates of COVID-19. Robust standard errors are clustered at city level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A5: Effects of Stabilization Policies

<i>Panel A. Effects of social security policies</i>									
	Cash < 1 Month			Reopen			Reopen < 1 Month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Social Security Deferrals	-0.056* (0.028)	-0.089*** (0.033)	-0.032 (0.037)	0.072** (0.032)	0.161*** (0.046)	0.025 (0.031)	0.110*** (0.034)	0.101** (0.047)	0.104** (0.044)
Sample	All	High Skill	Low Skill	All	High Skill	Low Skill	All	High Skill	Low Skill
Observations	1,466	487	808	1,861	596	1,039	1,504	462	854
R-Squared	0.016	0.037	0.010	0.029	0.083	0.010	0.064	0.071	0.049
<i>Panel B. Effects of credit guarantee policies</i>									
	Cash < 1 Month			Reopen			Reopen < 1 Month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Credit Guarantee	0.022 (0.023)	-0.007 (0.037)	0.020 (0.032)	0.015 (0.040)	0.032 (0.054)	0.005 (0.046)	0.019 (0.042)	0.067 (0.064)	0.025 (0.053)
Sample	All	AR > 0	AR = 0	All	AR > 0	AR = 0	All	AR > 0	AR = 0
Observations	1,466	484	668	1,861	588	878	1,504	487	706
R-Squared	0.012	0.013	0.018	0.021	0.038	0.020	0.052	0.042	0.068
<i>Panel C. Effects of rent reduction policies</i>									
	Cash < 1 Month			Reopen			Reopen < 1 Month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rent Reductions	-0.116** (0.052)	0.035 (0.073)	0.035 (0.073)	0.035 (0.073)	0.035 (0.073)	0.035 (0.073)	-0.021 (0.062)	-0.021 (0.062)	-0.021 (0.062)
Sample	State-property	State-property	State-property	State-property	State-property	State-property	State-property	State-property	State-property
Observations	255	305	305	305	305	305	244	244	244
R-Squared	0.055	0.051	0.051	0.051	0.051	0.051	0.079	0.079	0.079
<i>Panel D. Effects of loan supports</i>									
	Cash < 1 Month			Reopen			Reopen < 1 Month		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Loan Supports	-0.031 (0.027)	0.003 (0.039)	0.003 (0.039)	0.003 (0.039)	0.003 (0.039)	0.003 (0.039)	0.032 (0.042)	0.032 (0.042)	0.032 (0.042)
Sample	All	All	All	All	All	All	All	All	All
Observations	1,466	1,861	1,861	1,861	1,861	1,861	1,504	1,504	1,504
R-Squared	0.013	0.021	0.021	0.021	0.021	0.021	0.053	0.053	0.053

*Note:* This table reports the estimated effects of stabilization policies on whether SMEs hold less than one month of cash balance, their reopening status by the survey dates, and whether they expect to reopen in one month, if not reopen yet. Columns 1 and 4 report estimates for all sample firms; columns 2, 3, 5, and 6 report estimates for subsamples of firms. All regressions control for SMEs' basic characteristics (sales, employment, age, and service-sector fixed effect). Robust standard errors are clustered at city level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A6: Covariate Balance Summary, for PSM Analysis of Policy Effects

<i>Panel A. Social Security Exemption or Employment Stabilization Subsidies</i>				
	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Sales	0.433	0.025	1.770	0.914
Employment	0.562	-0.035	0.996	0.902
Age	0.054	0.021	1.268	1.224
Service Sector Indicator	-0.104	0.082	0.902	0.920
Distance to Wuhan	-0.010	-0.058	0.538	0.594
Ind. Dependence on Hubei	-0.295	-0.016	1.093	1.453
<i>Panel B. Rent or Utilities Reductions</i>				
	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Sales	0.108	-0.073	1.093	0.821
Employment	0.048	-0.088	1.117	1.120
Age	0.179	-0.088	1.074	0.735
Service Sector Indicator	0.079	0.057	0.958	0.965
Distance to Wuhan	0.051	-0.034	0.595	0.762
Ind. Dependence on Hubei	-0.121	0.037	0.958	0.965
<i>Panel C. Credit or Loan Supports</i>				
	Standardized differences		Variance ratio	
	Raw	Matched	Raw	Matched
Sales	0.272	-0.021	1.535	0.960
Employment	0.367	-0.001	1.204	0.972
Age	0.100	0.040	0.907	0.931
Service Sector Indicator	-0.122	-0.081	1.116	1.069
Distance to Wuhan	0.025	0.063	0.856	0.866
Ind. Dependence on Hubei	-0.039	0.006	1.096	1.093

*Note:* This table reports the balance test of covariates in the propensity score matching analysis of policy effects on reopening status. The covariates include firms' basic characteristics (sales, employment, age, and service sector indicator), geographic distance to Wuhan, and industry dependence on Hubei province. The treatment group comprises of firms that self-identify as recipients of corresponding policy supports. Each panel compares the mean and variance of covariates of the treatment and control groups, in raw and balanced data.

Table A7: Robustness Checks for the Effects of Lock-Down Policies

	Reopen (1)	Reopen <1 Month (2)	Reopen (3)	Reopen <1 Month (4)	Reopen (5)	Reopen <1 Month (6)
Social Distancing	-0.079* (0.040)	-0.121*** (0.039)			-0.008 (0.036)	-0.089** (0.040)
Highway Closure			-0.143*** (0.026)	-0.125*** (0.038)		
Highway Opening Rate					1.345*** (0.243)	0.661** (0.317)
Additional Controls	Wuhan + Hubei	Wuhan + Hubei	Wuhan + Hubei	Wuhan + Hubei	Logistics	Logistics
Observations	1,806	1,460	1,806	1,460	1,806	1,460
R-Squared	0.034	0.064	0.055	0.069	0.057	0.065

*Notes:* This table reports robustness checks of the effects of lock-down policies on SMEs' reopening status by the survey dates, and whether they expect to reopen in one month, if not reopen yet. Columns 1 to 4 include geographical distance to Wuhan and industry dependence on Hubei Province. Columns 5 and 6 include highway opening rate. All regressions control for SMEs' basic characteristics (sales, employment, age, and service-sector fixed effect) and city-level infection rates of COVID-19. Robust standard errors are clustered at city level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A8: Robustness Checks for the Effects of Stabilization Policies

<i>Panel A. Effects of social security policies</i>									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Cash < 1 Month			Reopen			Reopen < 1 Month	
Social Security Deferral	-0.049* (0.027)	-0.047* (0.027)	-0.053* (0.029)	0.093*** (0.032)	0.073** (0.030)	0.086** (0.035)	0.086** (0.041)	0.106*** (0.034)	0.117*** (0.038)
Observations	1,433	1,466	1,466	1,806	1,861	1,861	1,460	1,504	1,504
R-Squared	0.020	0.030	0.016	0.042	0.035	0.030	0.064	0.067	0.064
Additional Controls	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity
<i>Panel B. Effects of credit guarantee policies</i>									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Cash < 1 Month			Reopen			Reopen < 1 Month	
Credit Guarantee	0.018 (0.025)	0.030 (0.022)	0.035 (0.023)	-0.054 (0.040)	0.019 (0.041)	0.076 (0.043)	-0.001 (0.046)	0.018 (0.042)	-0.001 (0.044)
Observations	1,433	1,466	1,466	1,806	1,861	1,861	1,460	1,504	1,504
R-Squared	0.018	0.028	0.018	0.033	0.028	0.023	0.059	0.056	0.057
Additional Controls	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity
<i>Panel C. Effects of rent reduction policies</i>									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Cash < 1 Month			Reopen			Reopen < 1 Month	
Rent Reduction	-0.133** (0.057)	-0.116** (0.055)	-0.151** (0.062)	-0.017 (0.073)	0.035 (0.069)	-0.033 (0.069)	-0.062 (0.097)	-0.012 (0.060)	-0.084 (0.075)
Observations	251	255	255	301	305	305	240	244	244
R-Squared	0.056	0.060	0.058	0.098	0.051	0.068	0.079	0.099	0.088
Additional Controls	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity
<i>Panel D. Effects of loan support policies</i>									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Cash < 1 Month			Reopen			Reopen < 1 Month	
Loan Support	-0.009 (0.033)	-0.024 (0.026)	-0.011 (0.028)	0.014 (0.036)	0.002 (0.040)	-0.027 (0.046)	-0.013 (0.035)	0.028 (0.043)	-0.015 (0.045)
Observations	1,433	1,466	1,466	1,806	1,861	1,861	1,460	1,504	1,504
R-Squared	0.018	0.028	0.014	0.033	0.027	0.025	0.059	0.056	0.057
Additional Controls	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity	Economic	Wuhan + Hubei	Policy Intensity

Notes: This table reports robustness checks of the effects of stabilization policies on firms' short-term cash flow, reopening decision and expectations to reopen within one month. Columns 1, 4 and 7 include city level GDP per capita and ratio of social expenditure to fiscal revenue. Columns 2, 5 and 8 include geographical distance to Wuhan and industry dependence on Hubei Province. Columns 3, 6 and 9 include the number of other stabilization policies enacted at the city level. All regressions control for SMEs' basic characteristics (sales, employment, age, and service-sector fixed effect) and city-level infection rates of COVID-19. Robust standard errors are clustered at city level. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table A9: Medium-Run Effects of Credit Policies on Firms with High Credit Demand

	Cash < 1 Month	Reopen	Labor Recovery > 50%
Treatment group	0.137	0.909	0.749
Control group	0.247	0.904	0.716
ATT	-0.177*** (0.048)	-0.011 (0.031)	0.046 (0.050)
Number of matched pairs	175	175	175

*Note:* This table reports the estimated average treatment-on-the-treated (ATT) effects of credit support policies on SMEs' outcomes, based on the propensity score matching (PSM) method, for firms that see credit policies as an effective way to deal with the epidemic. The matching covariates include SMEs' basic characteristics (sales, employment, age, service sector indicator), geographical distance to Wuhan, and industry dependence on Hubei Province. Robust standard errors are reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .